



UNITED STATES PATENT AND TRADEMARK OFFICE

mn
UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/813,857	03/31/2004	Robert E. Cypher	5681-13501	5571
35690	7590	07/09/2007		
MEYERTONS, HOOD, KIVLIN, KOWERT & GOETZEL, P.C. P.O. BOX 398 AUSTIN, TX 78767-0398			EXAMINER ELAND, SHAWN	
			ART UNIT	PAPER NUMBER
			2188	
			MAIL DATE	DELIVERY MODE
			07/09/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/813,857

Applicant(s)

CYPHER, ROBERT E.

Examiner

Shawn Eland

Art Unit

2188

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 May 2007.
- 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-48 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-48 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Formal Matters

This Office action is in response to the Applicant's response filed on 05/03/07.

Status of Claims

Claims 1 – 48 are pending in the Application.

There are no amended, cancelled, or new claims.

Claims 1 – 48 are rejected.

Response to Arguments

Applicant's arguments filed 05/03/07 have been fully considered but they are not persuasive.

For the argument that element 33 cannot be the address network, the Examiner respectfully disagrees. The memory and the processor are part of element 32 in Liencres, which is connected to element 33.

For the argument that element 35 is not an active device, the Examiner respectfully disagrees. According to the Applicant's specification an active device is configured to perform accesses to memory within the node ([0053]). Element 35 accesses said memory by "acting as an interface between the processor cache memory 37 and the processor 21 (Liencres, col. 6, lines 67 – 68 through col. 7, lines 1 – 2). Element 32 fits this definition of an active device.

For the argument that element 32 is not a memory system, the Examiner respectfully disagrees. The cache subsystem is a memory subsystem within a node. Element 31 is another example of a memory subsystem found within a node.

For the arguments that the status bits do not indicate who the owner is and that there is no indication that the reply data should be sent, the Examiner respectfully disagrees. The status bits determine if the current node is the owner. Setting the “valid,” “shared,” and “owned” bits shows this and is something “one would customarily expect” according to Applicant’s response filed on 05/03/07 (1st full paragraph on page 4, lines 1 – 3). If the “valid” bit is not set, i.e. that the current cache line is not valid, and the “shared” bits are marked, this identifies that another node now owns the data and is modifying it. (See the explanations for figures 1a – 1b in *Liencre* for further reference.) This tells the node not to send data in reply, as it is not the owner of the data. (See, also, the explanations for figures 1c – 1d.)

Claims 1 – 48 remain rejected under the same grounds as the previous Office action – that is under *Liencre*.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Art Unit: 2188

Claims 1 – 48 are rejected under 35 U.S.C. 102(b) as being anticipated by *Liencren et al.* (US 5,434,993).

In regard to claim 1, Liencren teaches a plurality of nodes (*see element 20 in figure 3a; see column 6, lines 13 – 15*) coupled by an inter-node network (*see element 31*), wherein each node includes a plurality of active devices (*see elements 21 & 35*), a memory subsystem (*see element 32*), and an address network and a data network respectively configured to convey address packets and data packets between the plurality of active devices and the memory subsystem (*see element 31*); wherein a memory subsystem included in a node of the plurality of nodes is configured to maintain a response indication indicating whether the memory subsystem should send a data packet corresponding to a coherency unit in response to receiving from an active device in the node an address packet requesting an access right to the coherency unit (*see column 7, "Read Transactions"*); wherein the node is configured to store a node identifier for the coherency unit, wherein the node identifier identifies a different node of the plurality of nodes in which the coherency unit is in a modified global access state (*see column 7, lines 7 – 10*).

In regard to claim 17, Liencren teaches a plurality of client devices (*see element 20 in figure 3a; see column 6, lines 13 – 15*) including a memory subsystem (*see element 32*), an active device (*see element 21*), and an interface configured to send and receive coherency messages on an inter-node network coupling nodes in the multi-node computer system (*see element 31*); an address network configured to convey address packets between the plurality of client devices (*see element 33*); a data network configured to convey data packets between the plurality of client devices (*see element 33*); wherein the memory is configured to maintain a response indication indicating whether the memory should send a data packet corresponding to a

Art Unit: 2188

coherency unit on the data network in response to receiving an address packet requesting an access right to the coherency unit from the active device (*see column 7, "Read Transactions"*); wherein the node is configured to store a node identifier for the coherency unit, wherein the node identifier identifies a different node in the multi-node system in which the coherency unit is in a modified global access state (*see column 7, lines 7 – 10*).

In regard to claim 33, Liencres teaches wherein the multi-node computer system includes a plurality of nodes coupled by an inter-node network (*see elements 20 & 25 in figure 3a*), wherein each node includes an active device (*see element 21*), a memory subsystem (*see element 32*), and an address network coupling the active device and the memory subsystem (*see element 33*), the method comprising: a memory subsystem included in a node of the plurality of nodes receiving from an active device included in the node an address packet requesting an access right to a coherency unit (*see column 7, "Read Transactions"*); in response to said receiving, the memory subsystem sending a responsive data packet to the active device dependent on response indication associated with the coherency unit (*see column 7, "Read Transactions"*); the node sending a coherency message requesting the access right to a different node of the plurality of nodes in response to a node identifier identifying the different node as a node in which the coherency unit is in a modified global access state (*see column 7, "Read Transactions"*).

In regard to claim 2, Liencres teaches wherein each node includes an interface coupled to send and receive coherency messages on the inter-node network (*see element 31*), wherein an interface included in the node is configured to store the node identifier for the coherency unit (*see column 7, lines 7 – 19*).

In regard to claim 18, Liencres teaches wherein the interface is configured to store the node identifier for the coherency unit (*see column 7, lines 7 – 10*).

In regard to claim 34, Liencres teaches storing the node identifier for the coherency unit and sending the coherency message to the different node (*see column 7, lines 7 – 19*).

In regard to claims 3 & 19, Liencres teaches wherein the interface is configured to store the node identifier in a global information cache that includes storage for a plurality of node identifiers for a plurality of coherency units (*see element 46*).

In regard to claim 35, Liencres teaches wherein said storing comprises the interface storing the node identifier in a global information cache that includes storage for a plurality of node identifiers for a plurality of coherency units (*see element 46*).

In regard to claims 4 & 20, Liencres teaches wherein the interface included in the node is further configured to store a global access state of the coherency unit in the node (*see column 7, lines 7 – 10; see column 1, lines 64 – 65*).

In regard to claim 36, Liencres teaches the interface storing a global access state of the coherency unit in the node (*see column 7, lines 7 – 10; see column 1, lines 64 – 65*).

In regard to claims 5 & 21, Liencres teaches wherein in response to receiving a coherency message sent by another one of the nodes requesting an access right to the coherency unit, the interface is configured to access the node identifier and to responsively send an additional coherency message to an interface included in the different node (*see column 7, “Read Transactions”*).

In regard to claim 37, Liencres teaches in response to receiving a coherency message sent by another one of the nodes requesting an access right to the coherency unit, the interface

Art Unit: 2188

sending an additional coherency message to an interface included in the different node identified by the node identifier (*see column 7, "Read Transactions"*).

In regard to claim 6, Liencres teaches wherein in response to receiving yet another coherency message acknowledging that the other one of the plurality of nodes gained the access right to the coherency unit, the interface included in the node is configured to update the node identifier to identify the other one of the plurality of nodes if an active device included in the other one of the plurality of nodes gained write access to the coherency unit (*see column 7, "Write Transactions"*).

In regard to claim 22, Liencres teaches wherein in response to receiving yet another coherency message acknowledging that the other one of the plurality of nodes gained the access right to the coherency unit, the interface is configured to update the node identifier to identify the other one of the plurality of nodes if an active device included in the other one of the plurality of nodes gained write access to the coherency unit (*see column 7, "Write Transactions"*).

In regard to claim 38, Liencres teaches in response to receiving yet another coherency message acknowledging that the other one of the plurality of nodes gained the access right to the coherency unit, the interface updating the node identifier to identify the other one of the plurality of nodes if an active device included in the other one of the plurality of nodes gained write access to the coherency unit (*see column 7, "Write Transactions"*).

In regard to claim 7, Liencres teaches wherein if the interface included in the node updates the node identifier, the interface is configured to send an address packet indicating a new value of the node identifier to the memory subsystem included in the node (*see column 7, "Write Transactions"; see elements 34 & 46; see column 6, lines 64 – 67; see column 7, lines 7 – 10*).

In regard to claim 23, Liencres teaches wherein if the interface updates the node identifier, the interface is configured to send an address packet indicating a new value of the node identifier to the memory subsystem (*see column 7, "Write Transactions"; see elements 34 & 46; see column 6, lines 64 – 67; see column 7, lines 7 – 10*).

In regard to claim 39, Liencres teaches the interface sending an address packet indicating a new value of the node identifier to the memory subsystem if the interface updates the node identifier (*see column 7, "Write Transactions"; see elements 34 & 46; see column 6, lines 64 – 67; see column 7, lines 7 – 10*).

In regard to claims 8 & 24, Liencres teaches wherein the memory subsystem is configured to update the response indication in response to receiving address packets from one or more active devices included in the node (*see column 8, lines 13 – 32*).

In regard to claim 40, Liencres teaches the memory subsystem updating the response indication in response to receiving address packets from one or more active devices included in the node (*see column 8, lines 13 – 32; the data is prepared for write-back*).

In regard to claims 9, 25, & 41, Liencres teaches updating the response indication to indicate that the memory subsystem should not respond to address packets requesting an access right to the coherency unit in response to receiving an address packet requesting a write access right to the coherency unit from one of the one or more active devices (*see column 8, lines 33 – 46*).

In regard to claims 10, 26, & 42, Liencres teaches updating the response indication to indicate that the memory subsystem should respond to address packets requesting an access right to the coherency unit in response to receiving an address packet requesting to write a new value

Art Unit: 2188

of the coherency unit to the memory subsystem (*see column 8, lines 63 – 68; write-back should stop*).

In regard to claims 11, 27, & 43, Liencresteaches not updating the response indication in response to address packets requesting a shared access right to the coherency unit (*see column 9, lines 1 – 8*).

In regard to claims 12, 28, & 44, Liencresteaches the memory subsystem sending a packet corresponding to the address packet to the interface if: the response indication indicates that the memory should not respond; the coherency unit is in a shared global access state in the node; and the address packet requests write access to the coherency unit (*see column 8, lines 33 – 46*).

In regard to claims 13 & 29, Liencresteaches wherein in response to the packet corresponding to the address packet, the interface is configured to send a coherency message requesting write access to the coherency unit to the different node identified by the node identifier (*see column 7, “Write Transactions”*).

In regard to claim 45, Liencresteaches the interface sending a coherency message requesting write access to the coherency unit to the different node identified by the node identifier in response to receiving the packet corresponding to the address packet (*see column 7, “Write Transactions”*).

In regard to claims 14, 30, & 46, Liencresteaches sending a packet corresponding to the address packet to the interface if: the response indication indicates that the memory should not respond; and the coherency unit is in an invalid global access state in the node (*see column 8, lines 63 – 68*).

In regard to claim 15, Liencres teaches the node is configured to update the node identifier in response to receiving coherency messages from other ones of the plurality of nodes via the inter-node network (*see column 7, "Write Transactions"*).

In regard to claims 31 & 47, Liencres teaches the node updating the node identifier in response to the interface receiving coherency messages from other nodes in the multi-node system (*see column 7, "Write Transactions"*).

In regard to claims 16, 32, & 48, Liencres teaches an active device that sends the address packet specifying the coherency unit gaining the access right to the coherency unit in response to receiving the data packet from the memory subsystem if the memory subsystem sends the data packet (*see column 7, "Write Transactions"*).

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Art Unit: 2188

Examiner's Information


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shawn Eland whose telephone number is (571) 270-1029. The examiner can normally be reached on MO - TH, & every other FR.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hyung Sough can be reached on (571) 272-4199. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Shawn Eland
06/27/2007



HYUNG SOUGH
SUPERVISOR
7/3/07